



# Reducing Technical Risks & Uncertainties in EM Projects: The Tank Waste & Waste Processing Perspective

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# Engineering and Technology Program

- Mission: To Identify Vulnerabilities and to Reduce the Technical Risk and Uncertainty of EM Programs and Projects
- Vision: Engineering and Technology initiatives will provide the engineering foundation, technical assistance, new approaches, and new technologies that contribute to significant reductions in risk (technology, environmental, safety, and health), cost, and schedule for completion of the EM mission.



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# Strategic Planning for Engineering and Technology Program Activities

- Strategic Planning Approach
  - Implement Roadmap Initiatives
  - Select critical, high-risk, high-payoff projects
  - Complete Technology Readiness Assessments
  - Complete External Technical Reviews
  - Review Risk Management Plans
  - **Conduct Technical Workshops and Exchanges**
- Collaboration with National Laboratories, Private Sector, and Universities for innovative technologies and technical exchanges
- Work with Federal Project Directors



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# Waste Processing Planning Progress

- The December 2007 EM Technology Roadmap incorporates Stakeholder comments and adds strategies for spent nuclear fuel and nuclear materials.
- Identifies technology risks in Waste Processing along with other EM-20 areas (i.e., soil remediation, D&D)
- Outlines a process whereby the results of the Technology Readiness Assessments (TRAs), External Technical Reviews (ETRs) and the Technical Exchanges are incorporated into EM-21's planning process.
- Establishes strategic initiatives to address technical risks and identifies expected outcomes when implemented.
- Is a "living document"; will be available  
<http://www.em.doe.gov/Pages/EngTech.aspx>



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# Waste Processing Planning Progress (2)

- Multiyear Program Plan (MYPP) being developed to implement Roadmap; breaks down work, consistent with the Roadmap, into 5 Strategic Initiatives:
  - Improved Waste Storage Technology
  - Reliable and Efficient Waste Retrieval
  - Enhanced Tank Closure Processes
  - Next Generation Pre-Treatment Solutions
  - Enhanced Stabilization Technologies
- Staff from national laboratories and site offices across the DOE complex involved in formulating the E&T MYPP
- EM-21 MYPP will summarize:
  - prioritized work activities, required budget, schedule
  - major products/deliverables, performance metrics, and performer selection



# Sharing Technical Expertise and Lessons Learned: Viral to Reducing Risk and Technical Uncertainties

- Technology Exchange meetings have assured maximum benefits from outcomes of technology development performed across the DOE complex
- Focused workshops
  - Cementitious Workshop December 2006
  - Aluminum/Chromium Workshop January 2007
  - Technical exchanges among Savannah River, Idaho and Hanford on waste processing projects held in March and October 2007
  - In-situ Decommissioning Workshop September 2007
  - Pilot Plant Lessons Learned Workshop December 2007 (posting in-process)
  - Proceedings posted on Waste Processing website
- Common Issues teleconferences have shared technical design, construction and operational experiences of mutual interest to EM waste projects
  - Cross Flow Filter Testing – sharing of test information among sites
  - Cesium Ion Exchange Research – future benefit to multiple sites
  - Technology Readiness Assessments – input for process development
  - Pulse Jet Mixers Erosion Wear – improving the testing parameters
  - Fire Resistant Structural Design – lessons learned in design
  - Waste Transport and Pipe Plugging - lessons learned from operations



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# External Technical Reviews & Technology Readiness Assessments Help to Resolve Risks and Uncertainties

- High profile EM projects prompted the use of External Technical Reviews, for example
  - Tank 48 at Savannah River
  - Demonstration Bulk Vitrification System (DBVS) at Hanford
  - Salt Waste Processing Facility at Savannah River
  - Waste Treatment Plant (WTP) at Hanford
- Important to organize engineering and scientific expertise, through a structured review process to address difficult technical problems or resolve project management issues
  - External Technical Reviews support EM projects in addressing their risks and uncertainties
  - E&T works with Federal Project Directors to put together ETR charters and lines of inquiry using subject matter experts
  - Identify and document risks in Risk Management Plans
  - Incorporate Lessons Learned and Response Plans into EM projects
  - ETR and TRA Guidance Manuals currently being developed by EM



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# ETRs & TRAs (continued)

- o Technology Readiness Assessments along with development of technology maturity plans early in project key to reducing risks
  - Provides status of given technology relative to attributes described in each successive Technology Readiness Level (1-9) or, in other words, what development has been done at a given point in time
  - Provides a tool for DOE-EM to evaluate and communicate status of technology development in a consistent manner; process is structured and systematic
  - Developed by NASA; mandatory for DOD by Congress
  - **GAO** recommends TRA process for DOE (GAO-07-336); draft **FY2008 House Language** also supported it
  - Tool for **communication**
- o Eight Pilot TRAs conducted by DOE-EM to date
  - Hanford Waste Treatment and Immobilization Plant (WTP) Laboratory, Low Activity Waste (LAW) Facility and Balance of Facilities (3 TRAs)
  - WTP High-Level Waste Facility
  - WTP Pre-Treatment (PT) Facility
  - Hanford River Protection Project Low Activity Waste Treatment Alternatives
  - Hanford K Basins Sludge Treatment Process
  - Savannah River Tank 48H Waste Treatment Technologies



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# Value of Technical Workshops

- Opportunity for education, training and learning from the best minds available
- Reduces Technical Uncertainty
  - Defines current state of technology and identifies gaps
  - Maximizes development of constructive alternative strategies
- Captures participants lessons learned experience
  - What is working best
  - What is not working and why
- Helps to integrate DOE approaches complex-wide
  - Diminishes duplication of effort
  - Promotes consistency in approach to problem solving
- Communication among out technical leadership



# Conclusions

- Roadmap identifies strategies to reduce risks and improve technologies and processes at EM sites.
- External Technical Reviews have been proven useful in supporting critical project management decisions.
- Technology Readiness Assessments are a promising tool to delineate technical risk. Technology Maturity Plans are key to reducing project risk.
- Broader collaboration through technical exchanges are needed to ensure mission success



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